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June 18, 2001

HAND DELIVERED

Magalie R. Salas, Secretary
Federal Communications Commission
The Portals Building
445 12th Street, SW TW-A325
Washington, DC 20554

Re: IB Docket No. 01-96: The Establishment of Policies and Service Rules for the NGSO FSS in the Ku-Band

Dear Ms. Salas:

Transmitted herewith, on behalf of Denali Telecom LLC, are an original and 15 paper copies of Denali's comments in the above referenced rule making proceeding.

Please date stamp the enclosed "Return" paper copy and return it to the person delivering the package.

Should you have any questions, please contact the undersigned.

Sincerely,
PIERSON & BURNETT, L.L.P.

F. Kenneth Schwetje
David Lihani

Attorneys for Denali Telecom, LLC

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
The Establishment of Policies and Service	)	IB Docket No. 01-96
Rules for the Non-Geostationary Satellite	)	
Orbit, Fixed Satellite Service in the Ku - Band	)	

COMMENTS OF DENALI TELECOM LLC

I. Introduction

Denali Telecom, LLC ("Denali"), by its attorneys, and pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §1.415 and 1.419, hereby comments on the Notice of Proposed Rulemaking ("NPRM"), IB Docket No. 01-96 of the Federal Communications Commission (The "Commission"). Denali is an original applicant for a license to launch and operate thirteen satellites as the international "Pentriad"[SM] system. Denali supports the decision of the Commission to license all applicants.

By its NPRM the Commission seeks to determine the means by which allocated spectrum will be authorized for use by respective Non-Geostationary Satellite Orbit ("NGSO") Fixed Service System ("FSS") applicants. In its NPRM, the Commission discussed a set of possible spectrum sharing options and seeks comment on how to determine which of these options can best accommodate the new service, as well as how intra-service sharing criteria can be established among the applicants. The Commission seeks to establish a regulatory framework that does not favor any particular technology or operational method. The Commission also seeks

to ensure that all applicants have access to the spectrum, thereby structuring the proposed options to mitigate the effects of varying regulatory and sharing constraints that are associated with spectrum allocation.[1]

The Commission proposes four spectrum-sharing options, with an invitation for commenters to propose additional options. Those options are: (1) Flexible Band Segmentation; (2) Dynamic Band Segmentation; (3) Avoidance of In-Line Interference Events; and (4) Homogeneous Constellations. The Commission further seeks comment in this NPRM on a number of NGSO FSS licensing and service rules in light of the decisions made in the *First Report and Order* and the spectrum-sharing proposal presented in this NPRM.

II. Spectrum Sharing Options

Denali proposes that the Commission should adopt, from the choices enumerated in the NPRM, the "Avoidance of In-line Interference Events" (Option 3) as the coordination and frequency interference avoidance technique for this service. Denali further suggests, as stated herein, a slight modification for the Commission's consideration, which Denali believes may provide for greater efficiency in the use of the allocated spectrum.

A. *Favored Option - Avoidance of In-Line Interference Events*

Denali asserts that the Avoidance of In-line Interference Events option has the flexibility to achieve, and best promotes, the objectives of spectrum sharing over the other options, without the need for drastic changes by each of the applicants to the designs of their proposed systems. Avoidance of In-Line Interference requires sub-dividing the NGSO FSS spectrum only during

[1] *First Report and Order*, FCC 00-418, ¶ 2.

the time intervals involved in potential in-line interference events; and then, only if other interference avoidance options are not feasible. During all other times, the affected NGSO FSS systems can operate using the entire spectrum. Because all FSS systems must have relatively high-gain, narrow-beam antennas, separate NGSO FSS systems can share the same spectrum frequency and coverage with minimal spatial diversity (i.e., so long as they avoid near in-line interference events).

LEO satellite systems, that have the ability to avoid interference with GEO systems by switching communication paths to avoid in-line interference events with the geostationary orbit systems, have an inherent ability to avoid interference with HEO systems using the same technique. Furthermore, Pentriad's HEO system has some ability to avoid interference with LEO systems using the same technique. Coordination between HEO systems and MEO systems may be more difficult, but interference events will be limited in time and, therefore, the same mitigation techniques used by LEO systems to avoid interference with GEO systems can be used to avoid interference between those MEO and HEO systems. The most efficient way, in Denali's view, to determine how to coordinate this ability to avoid interference is for the Commission to allow for industry self-determination, thereby allowing the market to determine the most efficient use of the spectrum.

The Commission also requested opinion as to the likelihood of an In-Line Interference Event. Such likelihood, whether caused by the complexity of managing multi-constellation in-line interference events through satellite switching protocols or through frequency selection algorithms, would negate the inherent benefits of this option, and should be a concern to all applicants and the Commission. But, until simulations are conducted to determine this

likelihood, it is not known what the actual effects would be. Service providers will have to derive a solution to this problem -- perhaps facilitated by guidance from the Commission.

B. Homogeneous Constellations (Option 4)

Denali believes that there is some benefit in considering the option of Homogeneous Constellations, as described in the NPRM. However, LEO and HEO are premised on two different orbital architectures. We propose a modification below that would resolve this problem.

The ITU has determined that several NGSO FSS systems can share the same frequency band without interference when they employ nearly identical orbital parameters to minimize intersystem interference.[2] The systems transmission characteristics must also remain at a relatively uniform level.[3] An equal amount of spectrum allocated to each design, therefore would require each licensee to share its spectrum assignment with systems of a like design. This option would permit a number of similar constellations to operate on a non-interference basis. This might remove the burden from all participants, since there is no GSO or Molniya interference. However, the risk still exists that operators forced to use a homogeneous constellation design would eliminate the potential variety of system services and designs expected from the applications. Further, this type of system regulation may tend to dictate the outcome rather than allowing that outcome to be dictated by the service market.

C. *Modified Option - For Molniya[4] Constellations*

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[2] *See* ITU-R S.1431.

[3] Id.

[4] For purposes of this comment, Molniya Orbits are highly elliptical orbits, the orbit is a 12 hour period, 1470 x 38900km, 63.4° inclination .

Denali suggests that the Commission consider a slightly modified option to those presented in the NPRM. The Pentriad system employs a novel system design, which allows for multiple uses of the frequency spectrum. Because the operational service arc of the satellites is between 44.8 degrees North Latitude and 63.5 degrees North Latitude, Pentriad can operate without interfering with the operation of satellites in the geostationary/geosynchronous orbit utilizing the same frequencies. The Pentriad system design also allows for the implementation of multiple systems in other Molniya orbits by maintaining spatial diversity between the operational arcs of the satellites (geosynchronous satellites at zero degrees Latitude plus or minus five degrees North and South and the Pentriad HEO satellites operating between 44 degrees North Latitude and 64 degrees North Latitude). Thus, there is an effective separation of 39 degrees between GEO satellites and the operational arc of the Denali HEO satellites. Denali calculates that with twelve (12) longitudinal degrees spacing, up to six systems identical to Pentriad could operate without mutually harmful interference.

Development of the Molniya orbital resource will open new possibilities for other satellite services that can relieve pressures on scarce geostationary orbital resources and provide increased possibilities for reuse of the available frequency spectrum. The Pentriad system also can be coordinated with Non-Geostationary Satellite Orbit ("NGSO") systems operating in the LEO and/or Medium Earth Orbit ("MEO") orbits because of the like attributes of the Pentriad system. The LEO can use the same mitigating measures to avoid interference with HEO (Molniya orbit) satellites, such as Pentriad, that are proposed for LEO to avoid interference with geostationary/geosynchronous satellites.

Denali believes that the NGSO sharing problem must be stated in a three-dimensional space, spectrum and angular area. As was implicit with GSO sharing, the geometrical laws of orbit dynamics must also be considered. We believe that the Commission must include in its formulation of the Ku-band NGSO sharing question an important division into two classes: LEO/MEO and a Molniya. The characteristics of the two classes are distinguished in terms of number of satellites and ground station complexity.

Very similar to GSOs, we propose that Molniya NGSOs be assigned a set of specific celestial windows arranged around the Molniya belt, in addition to an assigned spectrum window. LEO/MEO NGSOs require a very large portion of the celestial sphere. These systems could be assigned a spectral window and use the celestial sphere in a manner that avoids interference with both GSO and Molniya NGSO systems. Sharing between Molniya NGSO systems and GSO systems is not an issue. These systems will not interfere because of the widely separated portions of the celestial sphere from which they operate. Thus, Molniya NGSO systems do not need, and will not have, any special capability to avoid interference with GSOs. It is already accepted that LEO/MEO NGSO must not interfere with GSO services. Thus, the LEO/MEO NGSOs will, by necessity, have a dynamic interference mitigation capability (e.g., satellite diversity and switching ground stations). This capability can be employed to avoid interference with the Molniya belts of the celestial sphere, as well as the GSO.

When thought of in terms of two classes of non-interfering NGSOs, the options become more appealing. Our modification suggests how LEO/MEO NGSO's may avoid interfering with Molniya NGSOs, just as they avoid interfering with GSOs. Option 4 is much more agreeable when thought of separately for Molniya and LEO/MEO NGSOs. It is natural -- even likely --

that the Molniya belts would be divided among a set of homogeneous constellations. Just like GSOs, which have homogeneous orbit characteristics, Molniya NGSO systems can coexist naturally.

D. *Flexible Band Segmentation and Dynamic Band Segmentation (Options 1 and 2)*

Compared to the options and modifications discussed above, these option do not promote the stated goals of the Commission in this NPRM. The problem with both of these options is that they restrict the available bandwidth necessary to provide the services that Denali believes can be provided under the latter options, for the reasons set forth above.

III. Service Rules

A. *Coverage Requirement*

The Commission proposed that NGSO FSS systems be capable of providing service on a continuing basis throughout the 50 States, Puerto Rico and Virgin Islands. The rationale applied to "Big LEOs" was to ensure efficient global use of a limited resource be applied here. The Pentriad system will provide continuous coverage to users in the entire service area proposed by the Commission in this NPRM.

B. Financial Qualifications

Denali agrees with the assumption and rationale of the Commission that a policy sharing plan can be devised to accommodate all the pending applicant's proposed systems, as well as future entrants. Therefore, Denali finds no basis for the Commission to require that applicants demonstrate their financial qualification as a prerequisite to a grant of an authorization to launch and operate their systems. As the Commission stated in its Order and Authorization regarding

the Teledesic Corporation[5] the requirements for making a financial showing are based on the entry opportunities in the service being licensed.

As has been stated previously in this application, implementation of the Pentriad system will not preclude the use of these bands by other NGSO FSS or GSO FSS systems. Because the Pentriad system does not preclude other qualified applicants from going forward in the same service, the Commission's rules on financial qualifications need not be applied.

C. *System License and License Terms*

Denali agrees with the Commission's proposals regarding the grant of authority for construction, launch and operation of a specified number of technologically identical space stations that constitute a constellation. Replacement satellites, technically identical to those in service including the same orbital parameters of the original constellation and not causing a net increase to number of operating satellites, should be applied for and acted upon as described in the NPRM. Denali continues to support the Commission's existing practice in this area .

[5] In the Matter of Teledesic Corporation Application for Authority to Construct, Launch and Operate a Low Earth Orbit Satellite Systems in the Domestic and International Fixed Satellite Service, DA 97-527 (March 14, 1997) (hereinafter the "*Teledesic Order*") stating that in cases where we [FCC] can accommodate all pending applications and where there is sufficient remaining capacity to address additional requests that may arise, we have not looked to current financial ability as a prerequisite to a license grant. [*See* Norris Satellite Communications, Inc., 7 FCC Rcd. 4289, 4290 (1992). Norris's authorization was subsequently declared null and void for failing to begin timely system construction. *See*, In the Matter of Norris Satellite Communications, Inc. for Authority to Construct, Launch, and Operate a Ka-band Satellite System, 11 FCC Rcd 5402 (1996)] This is because the grant of an authorization to one applicant will not prevent another qualified applicant from going forward with a proposal in the same service. [*See generally,* In the Matter of Amendment of the Commission's rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Band at ¶ 26, 9 FCC Rcd 5936 (1994) ("*Big LEO Report and Order*").] We ensure that licensees can, in fact, timely build their systems by requiring them to meet specified implementation milestones. In contrast, where applications for satellites exceed the number of satellites we can accommodate, we have adopted a standard that requires applicants to demonstrate evidence of internal assets or committed financing sufficient to cover construction, launch, and first year operating costs.

D. *Regulatory Classification*

Denali agrees that there is no need to deviate from the determinations in the *DISCO I Order* that fixed-satellite operators in the C-band and in the Ku band could elect to operate on a common carrier or non-common carrier basis[6]. In the *Teledesic Order*, the Commission provided the same treatment to Ka-band FSS licensees.[7] Denali respectfully submits that FSS application operators utilizing Highly Elliptical Orbits also should be given the option to elect to operate either on a common carrier or non-common carrier basis.

Denali's communication services, however, will not be offered on a common carrier basis. Customers of Denali who are local carriers authorized by their national administrations to provide domestic and international common carrier services may themselves offer common carrier services. Denali will act as a private or contract carrier. Denali will operate all of its proposed domestic and international fixed-satellite services as a non-common carrier and its services will not be sold to the general public. Denali anticipates negotiating service agreements on an individualized basis and tailoring the terms of agreements according to the particular needs of the service provider or the private network operator. Consequently, the Commission should allow Denali to operate its space segment capacity on a non-common carrier basis.

E. D*emonstration of Compliance with Aggregate EPFD*$_{DOWN}$ *Limits*

In this NPRM, the Commission proposes to defer further mandating the aggregate limits

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[6] *Amendment to the Commission's Regulatory Policies Governing Domestic Fixed Satellites and Separate International Systems and DBSC Petition for Declaratory Rulemaking Regarding the Use of Transponders to Provide International DBS Service,* 11 FCC Rcd 2429, 2436 (1996) (DISCO 1 Order).

[7] *See, Teledesic Order* at paragraphs 25-27.

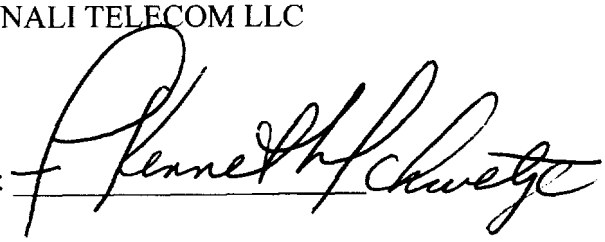
demonstration requirement on the aggregate $EPFD_{DOWN}$ Limits until a methodology is established for NGSO FSS applicants to demonstrate compliance. Denali agrees with this proposal. While applicants are aware that such a determination is pending, suitable methodology has yet to be developed that would allow the calculation of the aggregate $EPFD_{DOWN}$ produced by all NGSO FSS systems. Until full-scale simulations have been conducted, it is better to wait until verified figures can provide more information about the process and reasonable limits. Therefore, deferment is proper and desired.

IV. Conclusion

For the foregoing reasons, Denali supports the goals of the Commission to promote competition through opportunities for new entrants, to expedite the authorization process and to provide incentives for prompt service to the public using state of the art technology. Denali requests that the Commission adopt its comments which we believe will ensure that all applicants have equal access to the spectrum based on our recommendations for the adoption of spectrum allocation. Denali believes that the public interest would be well served by the applicants cooperation in the spectrum assignment process.

Respectfully submitted,

DENALI TELECOM LLC

By: 

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June 18, 2001

CERTIFICATE OF SERVICE

I hereby certify that on the Eighteenth of June, 2001, a true and correct copy of the foregoing Comments was sent via first-class mail, postage prepaid, or was hand-delivered, to each of the following:

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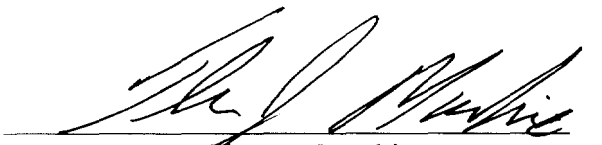

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Law Clerk, Pierson & Burnett, LLP

Dated: June 18, 2001